Red Tractor Assurance *for Farms*

Fresh Produce Scheme

Crop Module: Peas (vining, processed)

Effective 1st September 2015

Red Tractor Assurance

Welcome

This crop specific module for peas (processed) has been written to complement and avoid duplicating the generic principles of the Red Tractor Farm Assurance Fresh Produce Scheme standards. It is advisable to read the Red Tractor Farm Assurance Fresh Produce standards before reading this crop specific module. This module is designed to stimulate thought in the mind of the reader. It contains crop specific guidance and standards, where applicable, in addition to the requirements stated in the generic Fresh Produce standards.

Within this module the important requirements outlined in the crop specific standards section will be verified during the Red Tractor Farm Assurance assessment and compliance will form a part of the certification/approval decision.

Disclaimer and trade mark acknowledgement

Although every effort has been made to ensure accuracy, Assured Food Standards does not accept any responsibility for errors and omissions. Trade names are only used in this module where use of that specific product is essential. All such products are annotated® and all trademark rights are hereby acknowledged.

Notes: Pesticide Information

The Red Tractor Fresh Produce team has been working with Fera to provide tailored access to the LIAISON database for all Red Tractor Fresh Produce members. This system allows individual growers access to all information for plant protection products approved for use under the Red Tractor Fresh Produce Scheme.

LIAISON can be accessed under the Produce tab via the “Checkers and Services” page where you will also find a user manual. Searches will be filtered specifically for the crops for which you are registered. Once you have logged onto the site and clicked on the LIAISON hyperlink you will be directed to the LIAISON home screen.

You will need a username and password and these will be sent once you have registered:

http://assurance.redtractor.org.uk/rtassurance/services/Registration/members.eb .

General Introduction

Following a systematic approach will help growers identify and manage the risks involved in crop production. This module is based on a typical crop production process and food safety, health & safety, environmental and quality hazards are identified. Appropriate controls may then be established to minimise risk. Food safety and health & safety issues always take precedent over quality and environmental controls. The layout of this module follows the same structure as that used in the Red Tractor Farm Assurance Fresh Produce Standards. The content of the module is reviewed prior to the issue of updated editions. The review process considers both new developments and all relevant technology which has emerged since the last review was completed and which have been found to be both workable by the grower and beneficial to the environment. The aim is to transfer such information and technologies to growers.

Acknowledgements

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ADDITIONAL REQUIREMENTS AGAINST CURRENT STANDARDS

None for this crop module

CROP SPECIFIC STANDARDS

STANDARDS	HOW YOU WILL BE MEASURED	RECORDS (to be kept for 2 years)
CQ.48.a **Weeds must be controlled to prevent yield loss and ensure ease of picking**	■ Perennial grasses are eradicated with an application of glyphosate in autumn before sowing peas ■ Weeds that have not been eliminated by cultivations are killed, prior to sowing, with non-selective herbicides (e.g. glyphosate)	
CQ.48.b **Growers must adopt a policy for reducing volunteer problems for oilseed rape and potatoes**	■ Potatoes are not ploughed down after the harvest, as this aids their survival. Potatoes left on or near the surface are likely to be affected by frosts or eaten by animals	

GUIDANCE

CHOICE OF VARIETY OR ROOTSTOCK AND PLANT HEALTH CERTIFICATION

Continuity of cropping is achieved with the use of varieties with maturities from early to late and with sequential sowings based on accumulated heat units or on observations of seedling development.

Corn drills are suitable for sowing peas, which are drilled at about 5cm depth. The seed is thus covered by about 2-3cm of settled soil after rolling sufficient to avoid damage from any leaching of residual herbicides.

SITE AND SOIL MANAGEMENT

Climate

Excessive rainfall during the later stages of pea growth is undesirable. Plant habit becomes indeterminate and flowering prolonged. The bulk of haulm produced contributes to a humid microclimate that encourages fungal growth.

Temperature is not a limiting factor to pea growing within the UK, but it influences earliness of drilling which can be achieved and rate of growth. Peas do not grow at temperatures below 4.4°C. Although peas at early growth stages can survive frost, more advanced crops suffer damage. Damage from frost is unlikely if peas are sown after mid-February. Vining pea varieties have not been bred for winter hardiness.

Crop rotation

Crop rotation is essential to reduce the build-up of pests and soil-borne diseases. Several root-infecting fungi cause foot and root rots to peas, field, broad and green beans. All pea and bean crops should be treated as one crop and a break of at least four legume-free years should be maintained between them.

Soil type

Deep, free-working loams are suitable for peas. Extremes of soil type are to be avoided: drought prone sands (unless irrigated) and heavy clays are unsuitable. Pea roots are very sensitive to the physical condition of the soil and compaction and waterlogging are very damaging.

ENVIRONMENTAL PROTECTION & CONTAMINATION CONTROL

THE BASIC APPROACH TO CROP PROTECTION

The guiding principle is that pesticide use should be minimised. An integrated approach should be adopted to achieve this involving the following management steps.

Planning:

a. Sensible crop rotations to avoid build-up of problems

b. Careful site selection to avoid potential or previous problems thereby enhancing crop health and cleanliness

c. Inclusion of resistant varieties in cropping programmes whilst retaining the required quality parameters and eating characteristics.

Cultural preventative techniques:

a. Good crop and field hygiene

b. Promoting crop health by ensuring effective nutrient availability through soil analysis and accurate application of fertilisers and trace elements

c. Utilising available irrigation to promote healthy growth and as a control measure wherever appropriate and feasible.

Corrective action:

Where corrective or protective action is necessary the following approach should be adopted.

a. The need to take corrective or protective action must be established by regular monitoring and reference to established thresholds. The effect of prevailing and predicted weather on the need for treatments must be considered

b. The availability and use of biological and natural methods of pest and disease control must be reviewed and applied if appropriate

c. Where chemical control is essential:

- The least toxic and persistent product should be selected with due regard to its efficiency and ecotoxicity.
- The minimum effective dose should be used.
- Seed treatment should be considered as a first line of defence against certain diseases.
- An appropriate application method with effectively maintained equipment should be chosen.
- Selective and spot treatments should be used whenever appropriate.
- Use of foliar fungicides should be justified.

APPROVED USES NOT INCLUDED ON THE PRODUCT LABEL

In many circumstances, particularly for minor crops, product labels do not include all of the approved uses and growers wishing to check the approval notice of a particular product should note that this information is available using the LIAISON® search accessible via their RED TRACTOR Farm Assurance home page after logging in.

A search on the 'Specific Off-Label Approvals' (now EAMUs) page of LIAISON® by crop or product name should yield a results page. A click on the product name should link to a summary of the approval information. Near the bottom of the summary is the specific off-label or EAMU number (and this link will open up a pdf of the current document giving details of the extension of use.

PEST, DISEASE AND WEED CONTROL

PEST CONTROL

Field thrips (*Thrips angusticeps*)

Early sown peas on stony soils are susceptible to thrips damage. The tiny black "thunderflies" feed within the enclosed leaves of the growing point just as the seedlings are emerging from the soil. Damaged leaves are pale, distorted and thickened.

Chemical control: Where the pest is known to be an annual problem, a single spray of insecticide should be made as soon as the seedlings have begun to emerge and more than 4-5 thrips can be found in the tightly enclosed leaves. Work has indicated that good control of thrips can be achieved by Hallmark with Zeon Technology.

Cultural control: Thrips live for most of the year in the soil and are also pests of brassicas, linseed, spring barley and sugar beet, avoiding these crops in the rotations may reduce the surviving populations in susceptible soils.

Pea weevil (*Sitona lineatus*)

Early sown crops in a dry spring can be more severely affected by pea weevil. The adults feed on the leaves leaving semi-circular notches around the leaf margins. Larvae from eggs, laid by weevils during the feeding period, feed below ground on the root nodules. Occasionally, backward crops are retarded by a heavy weevil attack, but often, peas outgrow the initial setback.

Chemical control: Often peas recover from weevil attack and treatment in unnecessary, but where damage is experienced every year, a monitoring system can be used to establish the need for treatment. The system comprises five traps which should be sited in mid-February on the edge of the previous year's pea crop. If weevil catches are high close to the time of crop emergence, then spraying may be justified. An insecticide should be applied at the first sign of leaf injury which will reduce further damage and disrupt egg-laying.

Cultural control: Avoid producing cloddy seedbeds, as the weevils prefer these. A well-established crop, growing in good soil conditions, is more likely to grow away from the effects of the weevil. Later sown crops are less likely to suffer severe attacks.

A monitoring system is available from Agralan Ltd, Ashton Keynes, Swindon.

Pea cyst nematode (*Heterodera gottingiana*)

Peas affected by pea cyst nematode usually show signs of failure in late June. The damage occurs in clearly defined patches, in which the plants are short, upright and small leafed. Flowering commences early and the foliage becomes increasingly yellow. The root system is poorly developed, there are very few nodules present and many tiny cream to brown coloured lemon-shaped cysts can be found embedded in the root surface. Peas within the infested areas usually die prematurely.

Chemical control: There are no nematicides approved for use in peas.

Cultural control: Pea cyst nematode builds up in the soil as a result of frequent cropping with host crops. These include field and broad beans, sweet peas and vetches. A rotation of one of these crops in five years will help to prevent the establishment of the nematode. Once present, the cysts are very persistent and may remain viable for twenty years or longer. Where infestation is suspected, soil samples can be assayed for pea cyst nematode and further cropping should be avoided and care taken to avoid transport of soil from infested areas to clean fields. There are no varieties available which are resistant to pea cyst nematode.

Pea aphid (*Acyrthosiphon pisum*)

The large green aphid produce colonies in the growing points of peas causing flower loss, poor pod development and severe loss of yield if uncontrolled. They can also transmit viruses including pea enation mosaic virus.

Chemical control: Several approved insecticides are available for control of pea aphid. There are no reports of insecticide resistant strains in the UK. Crops should be examined regularly, particularly as they begin to flower and sprayed when aphids can be found on 15% of the plants. On late sown peas, examination should commence about three weeks after seedling emergence.

Cultural control: If the aphid threshold is not reached, then spraying is unnecessary. Pea aphids migrate to the crop in early summer from overwintering hosts and therefore cropping peas next to clover or lucerne should be avoided. Ladybird and hoverfly larvae predate aphids and these insects may keep down low infestations, however hoverfly pupae can contaminate vined peas.

Pea moth (*Cydia nigricana*)

Peas producing flowers from mid-June onwards are susceptible to attack particularly in areas where combining peas have been grown for several years. Damage is caused by the caterpillar that feeds on peas inside the pod. The moths are small (10-12mm), silvery brown and fly to flowering peas on warm days from June onwards. The larvae are creamy white, 3-6mm and can be found inside the pod.

Chemical control: Insecticides should be applied to control the caterpillar as it leaves the egg and moves to the young developing pod. Monitoring of pea moth is carried out using a pheromone-based pea moth trap (Oecos Ltd). Traps are placed in the pea field in mid-May and when moths are caught, a single spray is applied to flowering crops as soon as they have produced the first pod.

Cultural control: Pea moth populations develop where peas are left in the field to full maturity. Areas where combining peas are grown are likely to be a reservoir of moths. In other situations, unharvested green peas should be ploughed in before the larvae have left the dried pods, so breaking the life cycle. Early maturing peas may miss the moth flight period so control will be unnecessary. Growers with monitoring traps need not spray if no moths are caught.

Pea midge (*Contarinia pisi*)

A serious pest of vining peas, particularly in localised areas of Lincolnshire and Yorkshire, midge damage can cause yield loss in some seasons. The tiny midge adults lay eggs close to the developing flower bud and the larvae then feed at the base of the flowers causing them to become sterile. Larvae then emerge from damaged flowers and fall to the soil where they overwinter.

Chemical control: Where the pest is known to be a problem each year, a monitoring system using pheromone traps is available from Oecos, Kimpton, Herts. Traps should be placed in early June in fields which grew peas the previous year. Regular monitoring shows peak activity and susceptible crops should be examined immediately and an insecticide applied to the crop as soon as adults are found within the shoots to reduce egg laying. Plants should be examined as they reach the green bud stage by pinching together the leaves surrounding the buds and then opening up the leaves to look for the presence of the adult.

Cultural control: Varieties of peas with an extended flowering period can compensate for some loss of flowers and pods and should be grown in areas where midge is known to be a problem. Cropping in close proximity to the previous years infested crops should also be avoided. Where no midge are caught in the monitoring traps, crops in the near vicinity should not be sprayed.

Silver Y moth (*Autographa gamma*)

The caterpillars of the silver Y moth cause damage by feeding on the foliage and pods of vining peas. The caterpillars, pupae and chrysalis can contaminate the vined produce. Adult moths migrate from the Mediterranean and North Africa in late May onwards. They are grey brown in colour, with a wing span of 4cm and a characteristic inverted silvery white Y shape on each forewing. Eggs are laid on the foliage and caterpillars hatch 10-14 days later. The large green caterpillars move with a characteristic looping action and feed for about 3 weeks before spinning a cocoon in the upper foliage. Adults emerge from the shiny black chrysalids about 7 days after pupation.

Chemical Control: Monitoring of silver Y moth is carried out using a pheromone based funnel trap (Agralan Ltd.). Traps are placed in pea crops from mid-May and monitored regularly. Crop treatment is warranted when more than 50 moths have been caught in a trap by the time that the crop has set the first pods. A spray should be applied then and repeated 10 days later. Pyrethroid insecticides currently approved for pea moth control give good control of silver Y caterpillars.

Cultural control: Early-maturing peas may miss the moth flight period and control will be unnecessary. Growers with monitoring traps need not spray if the threshold is not reached.

Slugs and snails (e.g. *Deroceras, Milax and Cepaea spp.*)

Slug feeding can result in poor seedling establishment on wet or heavy soils with high organic matter. Seedling stems may be rasped through and the appearance of ragged leaves and slime trails are characteristic of slug attack. Later in the season, in wet conditions, slugs can feed higher in the foliage and can contaminate vined peas. Inclusion in the product can lead to rejection by the processor.

Snails favour chalky soils and migrate into the crop from vegetation surrounding the crop. The small-banded snails feed on the foliage and are a major contaminant in vined peas in some areas.

Chemical control: Slug damage to seeds and seedlings can be reduced using broadcasted pellets early in the crop growth stages. Wet weather conditions encourage slug feeding up to the cream bud growth stage, as it is difficult to control slugs immediately prior to vining. Late application of pellets could lead to contamination of the vined produce.

Cultural control: Soils containing high levels of organic debris including straw are most likely to harbour slugs. Such debris should be well dispersed, chopped and spread or disced before ploughing in the autumn. Avoid growing peas in close rotation with oilseed rape.

Maintaining a rotovated strip around the edge of the crop can discourage the migration of snails from the surrounding vegetation.

DISEASE CONTROL

Damping off (*Pythium spp.*)

Peas sown early in cold and wet conditions are prone to pre-emergence damping-off diseases. The main fungus attacking peas is *Pythium ultimum*, although other species may also be involved. The seed is attacked shortly after imbibition and a soft rot develops which eventually affects the developing root and shoot. Seedlings may fail to emerge, or collapse shortly after emergence.

Chemical control: Seed treatments, which contain thiram or metalaxyl M, protect the seed and seedlings from infection.

Cultural control: Avoid planting in cold wet soil conditions and for early maturing varieties, choose seed of high vigour. The electrical conductivity test for assessing pea seed vigour can be carried out by several seed testing laboratories and seed with medium vigour should only be used for later sowings when soil conditions are warmer. Good soil structure is also important and Ppas should not be sown deeper than 5cm to allow rapid germination and emergence.

Foot rot/Root rot (*Fusarium solani f. sp. pisi, Phoma medicaginis var. pinodella/Aphanomyces euteiches*).

Affected plants appear in patches or along sections of rows, with symptoms that begin to show up from mid-May to July. Plants are stunted, pale and the lower foliage may dry up. The flowering period is shortened and often infected plants die before pods have developed. The root system may be brown and poorly developed and the base of the stem discoloured. *Fusarium* causes a brick-red discolouration in the vascular tissue which can be found after scraping back the epidermis at the stem base with a sharp knife. Infection by *Phoma* results in a blackening of the stem base which eventually shrivels the stem causing the plants to collapse or break-off at soil-level. *Aphanomyces* root rot is encouraged by wet soils. The roots are discoloured and outer layers of tissue easily slough off, leaving the stringy vascular tissue intact.

Chemical control: No fungicides are approved for the control of these soil-borne diseases, however, *Phoma medicaginis* can be seed-borne and seed treatments which contain fludioxonil will give some control for seed known to be infected.

Cultural control: A strict rotation of peas and beans is necessary to prevent the build-up of these diseases in the soil. Peas and beans should be treated as one and the same crop and a break of at least four years should elapse between crops. Consolidated or poorly drained soils can also predispose peas to infection and over working of soils prior to drilling should be avoided. A predictive soil test has been developed to avoid planting peas in high-risk fields and is available from Processors and Growers Research Organisation.

There are no varieties currently available which are resistant to these diseases. Use healthy seed.

Leaf and pod spot (*Ascochyta pisi, Mycosphaerella pinodes, Phoma medicaginis var. pinodella*)

This group of diseases, caused by three closely related fungi, is also referred to as the 'Ascochyta complex'. All are seed-borne, but *M. pinodes* and *P. medicaginis* can also survive in the soil for several years. *P. medicaginis* also causes a foot rot. The most common leaf and pod spotting is caused by *M. pinodes*. In wet weather, many small dark-brown or purple spots develop small, circular, sunken spots, brown to black in colour and 1-2mm in diameter. In severe infection, the plants may be defoliated and patches die prematurely.

Chemical control: The fungi are seed-borne and if tested seed is found to be infected then seed treatments containing fludioxonil should be used. To prevent leaf and pod spot developing in wet seasons, fungicides can be applied as soon as the first spots are seen on the foliage. In order to reduce pod infection, a spray should be applied as soon as the first pod is visible following a disease risk assessment. In dry seasons, such treatment is unnecessary.

Amistar can be used on processed peas for the control of leaf and pod spot. Some control of grey mould (*Botrytis cinerea*) and *Mycosphaerella* blight may also be achieved.

Consult your processor before using a fungicide.

Cultural control: Use only healthy seed and avoid excessive overhead irrigation during the pod setting period. Crops that produce a drier microclimate are less likely to become infected. Peas should not be grown more frequently than once in five years on the same land.

Downy mildew (*Peronospora viciae*)

Symptoms can appear at any time from emergence onwards. The fungus is soil-borne and commonly infects seedlings before emergence. Infected plants are pale and remain stunted. The undersides of the leaves are thickly covered with grey-mauve coloured velvety mycelium. Infection then spreads from these plants by air-borne spores. Other plants then produce leaves with yellow-green spots or areas on the upper surface of the leaves with the velvety mildew on the underside. The growing points of the plants may also become infected and pods may appear yellow and blotchy, fail to fill and a cottony white growth occurs within the pod wall.

Chemical control: There are no effective means of control once the disease has become established. Seed treatment with a cymoxanil and metalaxyl M is effective in preventing the initial seedling infection thereby reducing the amount of air-borne inoculum that causes the secondary infection.

Cultural control: Avoid planting peas in fields where there has been a history of downy mildew infection. Some early maturing varieties are very susceptible to mildew and these should be avoided in high-risk fields. Later sown crops are not so susceptible to seedling infection. Information on the relative susceptibility of varieties to downy mildew is available in the PGRO Vining Pea Growers Guide.

Powdery mildew (*Erysiphe pisi*)

Peas can become infected from early flowering onwards and maincrop and late maturing peas are particularly susceptible. Leaves and stems become covered with a white 'dusty' film. Diseased tissue can then become discoloured and pods may also be severely infected and the produce is spoilt both by the surface pod infection and the failure of such pods to fill adequately. The disease is followed by hot dry conditions during the day, and high humidity at night.

Chemical control: There are no fungicides approved in peas for the control of powdery mildew, although cyproconazole or sulphur may reduce the risk of infection in late sown crops.

Cultural control: Several varieties are completely resistant to powdery mildew and these are particularly useful for maincrop and late season planting. Information on the relative susceptibility of varieties to powdery mildew is available in the PGRO Vining Pea Growers Guide.

Botrytis pod rot (*Botrytis cinerea*)

Pod rot (grey mould) occurs in wet seasons when the flower petal sticks to the developing pods or lodges on the stems in the leaf axils. Botrytis colonises the moribund petals and then infects the pod or stem causing a grey-brown rot that may eventually become covered with grey fluffy mycelium.

Chemical control: In wet seasons, a fungicide should be applied as soon as the first pod is visible. In dry seasons, treatment is unnecessary.

Consult your processor before using a fungicide.

Cultural control: The disease is favoured by wet conditions and dense crops are more susceptible to infection.

Sclerotinia (*Sclerotinia sclerotiorum*)

The disease causes a white mould of the stems and pods in dense crops with lush foliage. It spreads rapidly in warm humid conditions. The stems become covered with dense white mycelium and then collapse. The infection can progress to the pods. After a short time, hard black resting bodies (sclerotia) develop in the mycelium and within the stems of infected pods.

Chemical control: Some fungicides applied at first pod stage to prevent Botrytis infection will also provide good protection against *Sclerotinia*.

Consult your processor before using a fungicide.

Cultural control: Sclerotinia can affect a wide range of crops including carrots, green beans, potatoes, brassicas, oilseed rape and linseed. Cereals are not infected and a rotation, which allows at least three years between host crops, will prevent a build-up of the fungus in the soil. Sclerotia remain viable for several years, but germinate in the spring. Where infection occurs, the land should be deeply cultivated before planting cereals. Peas should not be grown in fields adjacent to the previous years infected crop.

Pea enation mosaic virus (*PEMV*)

The symptoms are not often noticed until the flowering or pod setting stage. The virus causes vein clearing and the formation of translucent spots on the leaves and stipules. Leaves may be crinkled and the top of the plants becomes yellow and mottled. Pods may be distorted or develop sharp ridges across or along the surface. Infected plants can appear in patches as the virus is transmitted by the pea aphid **(see Pea aphid (Acyrthosiphon pisum))**.

Chemical control: Control of aphid infestation will prevent the virus becoming established.

Cultural control: The disease is not seed-borne. Some newer varieties are resistant to PEMV. The virus can also infect broad and field beans and sweet peas and cropping in close proximity to these alternative hosts should be avoided.

Pea bacterial blight (*Pseudomonas syringae pv pisi*)

Although not often seriously affecting spring sown peas, early-planted crops may develop symptoms particularly if the peas have been damaged by a late spring frost. Leaves and stems develop water-soaked lesions that may extend into larger areas. Eventually such lesions dry out and turn brown, stems may collapse and pods also develop water soaked spotting together with bacterial ooze.

Chemical control: There is no means of controlling pea blight.

Cultural control: The use of healthy seed is essential, especially for varieties that are early sown. A seed test is available from Processors and Growers Research Organisation, NIAB and SASA.

WEED CONTROL

Weed infestations cause yield depression of peas. Weedy contaminants in machine-harvested produce may cause crops to be rejected. Every effort should be made to eliminate weeds in the field.

Efficient ploughing can reduce many weed problems. An application of glyphosate either pre-harvest of cereals or in autumn before sowing peas, is the most effective way of eradicating perennial grasses. Over-wintered weeds should be eliminated before drilling by cultivations. Any remaining, together with weeds which emerge before the crop, can be killed by non-selective herbicides (e.g. glyphosate).

Weed control is achieved with a combination of pre-emergence residual and foliar acting post-emergence herbicides. Post-emergence herbicides with contact activity should only be applied to peas with good leaf wax cover. Leaf wax can be tested with crystal violet dye. If herbicides containing MCPB are applied after flower buds can be found in the terminal shoot, abscission of the pods may result.

Work has indicated the usefulness of mechanical weeding techniques to control seedling annual weeds. This technique is suitable for light soils and should be carried out in dry conditions. Weeding can be made either across or in the direction of the pea rows when the peas are between the second and fifth node growth stage. The technique is not suitable for grass weeds, perennials or deep-rooted weeds such as black-bindweed, nor is it suitable to control volunteer potatoes. A post-emergence herbicide may be required where late germinating or vigorous weeds become established.

Problem weeds

Growers must adopt a policy for reducing volunteer problems for oilseed rape and potatoes by using appropriate husbandry practices after harvest of these crops. Volunteer potatoes can be a severe problem because the berries are toxic contaminants in vining pea produce and crops may be rejected. After the potato harvest, do not plough down remaining tubers, this aids their survival. Potato tubers left on or near the soil surface are likely to be affected by frosts or eaten by animals. Every attempt should be made to control potatoes in other crops in the rotation because they cannot be killed in peas. Rotations should be planned carefully. An Extension of Approval for Minor Use (previously SOLA) for flumioxazin may be useful for potato control.

Allowing shed seed to germinate after harvest can reduce volunteer oilseed rape numbers. Volunteer oilseed rape is controlled with some herbicides.

NUTRITION

MAJOR NUTRIENTS

Prior to cropping the field, nutrient status should be determined by sampling and analysis. Fertiliser application must be in accordance with crop needs and soil reserves. Particular care should be taken to avoid build-up of unnecessarily high levels of phosphorus in the soil as this can cause pollution of surface waters.

Nitrogen-fixing *Rhizobia* bacteria, responsible for root nodulation of peas, occur naturally in UK soils and supply peas with their nitrogen requirement. Applications of nitrogen fertiliser, farm manure or sewage sludge are unnecessary and will delay and suppress nodulation. If peas show symptoms of nitrogen deficiency this may be due to the destruction of root nodules. In conditions of waterlogging, for example, do not apply nitrogen fertiliser as it will not be effective because the damaged root system is unable to take up nitrogen.

Examples of typical fertiliser recommendations are given in the Fertiliser Manual (RB209). See Appendix.

Phosphate and potash are applied as a base fertiliser before cultivation.

Peas may suffer from sulphur deficiency on sandy, shallow or medium textured soils with low organic matter, and which are far from industrial S emissions. Where deficiency is likely, apply 37.5 to 50kg/ha SO_3 to the seed bed before sowing.

Proprietary foliar feeds are unnecessary and unlikely to give lasting beneficial effects. Under some conditions they may cause crop scorch.

Lime and pH

Peas require a pH of at least 5.9 to 6.5. If the pH is below 5.8 an application of lime will be needed. Over-liming should be avoided as it can induce deficiency of trace elements such as manganese.

Trace elements

Treatments should only be applied where a deficiency problem has been identified.

Manganese deficiency symptoms are chlorosis between veins and round margins of the leaves. Occasionally 'Marsh Spot' disorder, a necrotic spot that appears on the adaxial surfaces of the cotyledons, occurs in vining peas. It occurs where the soil is deficient or where manganese is unavailable to the plant and is common on peaty organic or sandy soils and where the pH is over 6.8. Soil analysis for manganese is of little value. Foliar sprays of manganese sulphate and wetter can correct the deficiency.

Magnesium deficiency is less common, occurring late in the growth of the crop. Symptoms are interveinal chlorosis but the leaf margins remaining green with older leaves affected first. It is more likely to occur on sandy, acid soils and where there is excess potash. Soil analysis will identify the problem. At an index of 0 and if lime is also needed, correction can be made by an application of with magnesian limestone (see Appendix) either before peas are sown or elsewhere in the rotation. If crop treatment becomes necessary corrective foliar sprays with magnesium sulphate should be applied.

Post harvest cultivations

Green crop residues from peas have a high nitrogen content and in order to reduce leaching of nitrogen into ground water, ploughing or cultivating them in after harvest should be delayed until just before planting the next crop (see DEFRA's Code for Good Agricultural Practice for Water).

IRRIGATION

Peas are highly responsive to irrigation and scheduling systems will help forecast the timing and the priority order. Peas are most sensitive to soil moisture deficits at the beginning of flowering and during pod swelling. Irrigation during petal fall may increase the occurrence of *Botrytis*.

HARVEST AND STORAGE

It is recommended that areas of crop adjacent to lay-bys, public high ways, footpaths and housing etc. are inspected just before machine harvest. Any glass, metal, plastic or other foreign bodies should be removed to avoid product contamination and the resulting problems in the factory.

RESIDUES AND CONTAMINANTS

Red Tractor Farm Assurance Fresh Produce is aware that a key area in the production of fresh produce which requires continued attention by growers and their advisers is that of keeping pesticide residues to a minimum. This issue is not just one of meeting the MRL trading standard but ensuring that any individual or multi residues are kept as low as possible below this level.

The key targets are:

- Optimising late applications of fungicides and insecticides to the edible part of the crop
- Optimising the use of post-harvest treatments
- Ensuring minimum harvests intervals are followed
- Ensuring that application equipment is applying products correctly

Currently there are no residue issues associated with this crop but awareness needs to be maintained for any future issues.

APPENDIX 1: TYPICAL APPLICATION RATES FOR MAJOR NUTRIENTS

Major nutrient requirements (kg/ha) (Source: Defra Fertiliser Manual RB209)

Nutrient	Soil Index				
	0	1	2	3	3+
Phosphate(P_2O_5)	100	70	40	0	0
Potash (K_2O)	100	70	40 (2-) 20 (2+)	0	0
Magnesium [1] (MgO)	100	50	0	0	0

Notes:

[1] Magnesium is not necessary for every crop and can be applied elsewhere in the rotation as magnesian limestone on acid soils.

At low soil indices (0 or 1) (ADAS classification) the recommendations for phosphate and potash are adequate to increase yields and also to leave a residue that will build up soil reserves over a number of years. If there is no long-term policy of building up soil P + K at index 0 or 1, the recommendations may be reduced by 50kg/ha at index 0 and 25kg/ha at index 1.

The fertiliser is applied prior to cultivation. Not more than 50kg/ha of K_20 should be combine drilled otherwise germination may be affected.

Peas may suffer from sulphur deficiency on sandy, shallow or medium textured soils with low organic matter and which are far from industrial S emissions. Where deficiency is likely apply 37.5 to 50kg/ha SO_3 to the seedbed before sowing.

Where FYM is used, reduce the amount of fertiliser accordingly.

Consult your processor before using FYM. Untreated and digested sewage sludge must not be applied within the crop rotation.

Only advanced treated sewage sludge may be used within the crop rotation and it must not be applied within 10 months of harvest. Applications shall be carried out in accordance with the Regulations and the current Defra Code of Practice for the Agricultural Use of Sewage Sludge.

Exempted wastes for example septic tank sludge and blood and guts from abattoirs should not be used within the rotation.

Consult your processor if vegetable waste is to be applied to the field.

Copies of various publications on pea and bean production, herbicides and pesticides are available to PGRO levy payers from:

Processors and Growers Research Organisation
The Research Station,
Great North Road
Thornhaugh
Peterborough
PE8 6HJ

Tel: **01780 782585**

Web: **www.pgro.org**

Technical updates are downloadable from the website at **www.pgro.org**

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Red Tractor Assurance

Certification Bodies

Your routine point of contact with the Scheme is through your Certification Body.

Certification Bodies are licensed by Red Tractor to manage membership applications and to carry out assessment and certification against the Standards. The table below shows which Certification Bodies apply to each enterprise.

Certification Body	Beef and Lamb	Dairy	Combinable Crops and Sugar Beet	Fresh Produce	Pigs	Poultry
NSF	✔	✔	✔	✔	✔	✔
Kiwa PAI	✔	✔	✔	✔	✔	✔
SAI Global	✔	✔	✔	✔	✔	✔
SFQC	✔	✔	✔	✔		
NIFCC (Northern Ireland)		✔				✔
QWFC (Wales)		✔				

NSF Certification

NSF Certification
Hanborough Business Park
Long Hanborough
Oxford OX29 8SJ
Tel: 01993 885739
Email: agriculture@nsf.org
Web: www.nsf-foodeurope.com

PAI kiwa Partner for progress

Kiwa PAI
The Inspire,
Hornbeam Square West, Harrogate,
North Yorkshire HG2 8PA
Tel: 01423 878878
Email: paienquiries@kiwa.co.uk
Web: www.kiwa.co.uk/pai

SAI GLOBAL ASSURANCE SERVICES

SAI Global Assurance Services Ltd
PO Box 6236,
Milton Keynes MK1 9ES
Tel: 01908 249973
Email: agrifood@saiglobal.com
Web: www.saiglobal.com/assurance

SFQC
Specialist assurance for the food and farming sectors

SFQC Ltd
Royal Highland Centre,
10th Avenue, Ingliston,
Edinburgh EH28 8NF
Tel: 0131 335 6605
Email: redtractor@sfqc.co.uk
Web: www.sfqc.co.uk

NIFCC
NORTHERN IRELAND FOOD CHAIN CERTIFICATION

NIFCC [Northern Ireland]
Lissue House,
31 Ballinderry Rd, Lisburn,
Northern Ireland BT28 2SL
Tel: 028 9263 3017
Email: info@nifcc.co.uk
Web: www.nifcc.co.uk

QWFC

QWFC [Wales]
PO Box 8, Gorseland,
North Road
Aberystwyth SY23 2WB
Tel: 01970 636688
Email: info@wlbp.co.uk
Web: www.wlbp.co.uk

Red Tractor Assurance *for Farms*

Fresh Produce Scheme

T: 01932 589 800
E: produce@redtractor.org.uk
www.redtractorassurance.org.uk

Fresh Produce Standards